Conservation Farming Unit

CONSERVATION FARMING & CLIMATE SMART AGRICULTURE

HOUSEHOLD ECONOMY ANALYIS (HEA) FOR IMPACT ASSESSMENT OF THE CLIMATE SMART AGRICULUTURE – ZAMBIA (CSAZ)

A Study for the CSAZ by

Sebastian Gavhera Consortium

TABLE OF CONTENTS

EXECUTIVE SUMMARY 2
Overview of the Outcome Analysis Assessment 2
Objectives of the Study 2
Key Study Findings in Summary 3
Impact Indicator Values - 2019. 4
Recommendations 4
1. INTRODUCTION AND BACKGROUND 1
1.1 Understanding the CFU Climate Smart Agriculture Project 1
1.3 The Country Context in which the Project is set 2
1.4 The Outcome Analysis Study Objectives 3
1.5 The Conceptual Framework 6
1.5.1 Household Economy Assessment (Outcome Analysis) 6
1.6 The Outcome Analysis Implementation Strategy 11
2. OUTCOME ANALYSIS STUDY FINDINGS AT LIVELIHOOD ZONE LEVEL 13
2.1 Key parameters – Problem Specifications 13
2.2. Zone 1: The Commercial Railway Line Maize, Livestock, and Cotton (ZM08) 14
2.3. Zone 2: The Southern Plateau Cattle, Maize and Tobacco~ ZM09 20
2.4. Zone 3: Eastern Plateau Maize, Cotton and Groundnut (ZM16) 25
2.5 Zone 4: Eastern Plateau Maize, Groundnut, Tobacco and Trade (Chipata) ~ ZM 17 29
3. KEY FINDINGS & RECOMMENDATIONS 34
3.1 Key Findings 34
3.2 Recommendations 35
4.0 ANNEXES 36
4.1. Annex 1 – Impact Indicator Summary Tables by Zone 36
4.2 Annex 2 – Assessment Team and Areas 38
4.3. Annex 3 – Data Collection Tools Used In the Assessment and Assignment TORS 39

EXECUTIVE SUMMARY

Overview of the Outcome Analysis Assessment

This Outcome Analysis assessment (second phase) is a follow up to the first Conservation Farming Unit (CFU) Climate Smart Agriculture (CSA) Outcome Analysis scenario study which was done in September 2018 using the Household Economy Approach (HEA). The HEA approach involves both qualitative and quantitative methods to get an understanding of the differences between conservation farming adopters and non-adopters in selected four Livelihood Zones where CFU operates in. These Livelihood zones are 1) ZM08 - The Commercial Rail Line Maize, Livestock, and Cotton; 2) ZM09 - The Southern Plateau Cattle, Maize and Tobacco; 3) ZM16 - Eastern Plateau Maize, Cotton and Groundnut; and, 4) ZM17- Eastern Plateau Maize, Groundnut, Tobacco and Trade. These zones are under Central, Eastern, Western and Southern areas of Zambia where the CFU Climate Smart Agriculture Zambia project is being implemented. The CSAZ project targets small-scale farmers in the rural and peri-urban areas. These farmers are in turn expected to practice, and therefore adopt one form or another of Conservation Farming Minimum Tillage (CF MT) practice. As part of the methodology to examine the impact of the CSAZ project, the second round of the Outcome Analysis study collected information from two groups of small-scale farmers: those that had adopted CSA CF MT and those that were using Conventional farming systems. The second round of the Outcome Analysis became necessary after the country had experienced some devastating drought across all districts, hence the need to make an impact assessment of the benefits of adopting conservation farming.

Objectives of the Study

The outcome analysis phase 2 study objective was to provide evidence on the functioning of local livelihoods, mainly agriculture, as a way of guiding appropriate decision making that incorporates context specific needs, particularly the distinction between CF MT adopters and Conventional farmers after incorporating an intervention and a hazard/shock. In this case the major shock was a drought which ravaged most parts if not all parts of Zambia in the 2018/19 cropping season. The primary purpose of the study is to provide evidence or timely and appropriate decision making on response to needs for livelihoods and food security programming acknowledging the difference between Conservation Farming MT adopters and Conventional farmers (non-adopters).

Methodology

The Household Economy Approach (HEA) was used for collecting and analyzing field-based livelihood information on different wealth groups, specifying problems in the current year on both prices and quantities in the current period and then profiling all these in Livelihood Impact Analysis Spreadsheets (LIAS) and identifying the effects of these in livelihoods. This methodology allows for a holistic approach to understanding the way people normally respond to different shocks and hazards hence providing a good starting point for objectively demonstrating change in people's access to food and cash due to multiple changes by allowing analysis of the impact of changes in individual livelihood strategies as well as its contribution to total livelihood access based on a baseline which was compiled in 2017 with **May 2016 to April 2017**[1] as reference period – a year used to describe and quantify occurring livelihood patterns for households and is used as a benchmark against which changes in future access are measured.

[1] The year was a normal year with good harvest, pastures and adequate surface water for both livestock and domestic use characterized by improved livestock conditions

Key Study Findings in Summary

This study provided one of the clearest ways of answering the big question: ***Does Climate Smart Agriculture work?*** The basic assessment finding was that the 2018/19 agricultural season was actually worse than 2017/18 which made it clearly a very bad season for rain-fed agriculture as it was a severe drought particularly the southern part of the country. In this regard the assessment provided a rare opportunity for comparison between the performance of CSA adopting households and their Conventional Farming counterparts in terms of household economies with particular focus on food security. The clearest and uncontested narrative coming from this CFU Climate Smart Agriculture (CSA) Outcome Analysis second phase study is that of adopters tending to be more food secure as a function of their reliance on consumption of food that they produce and also more inclined to be more capable of maintaining their livelihoods (to be resilient) when compared to Conventional farmers. This is evidenced by the capacity of both the Very Poor and Poor adopters in achieving both the Survival and Livelihood Protection Thresholds despite the production year being very bad because of drought which became the biggest shock embedded in the current year. The Outcome Analysis Phase 2 study produced some overwhelming evidence that adopting Climate Smart Agriculture technologies (in this case "CF MT") provided a cushion against the effect of drought as was shown in the first phase of CFU Climate Smart Agriculture (CSA) Outcome Analysis. This report presents LIAS results for the Very Poor and Poor adopters and Conventional farmers because the evidence of the difference between the two groups was best articulated at that level which made presentation of results for the middle and better off households redundant. Climate Smart Agriculture CSA adopters, compared to Conventional farmers across the four Livelihood zones got more of annual food requirements from own crop production and less from other sources particularly casual labor as own crop production was less; reduced by the 2018/19 cropping season severe drought compared to how it affected the Conventional farmers. These are the conclusions made:

1. It is concluded that the main source of food and income is explained very much by farmers' own crop production in all the zones though, as explained before, the contribution is more among adopters than Conventional farmers. However, it is interesting and important to note that there remains, as was seen in the previous assessment to be additional sources of food and income in Zone ZM17 and these non-agricultures related activities.

2. The comparative profile of Livelihood strategies across the four Livelihood zones exhibited that the major shock associated with drought was reduction of maize production across the four zones for both adopters and Conventional farmers with an undisputable difference in the magnitude between Conventional and adopters. In the current study, across the four zones maize production was reduced by around 30% in adopters while Conventional farmers suffered losses of more than 50%.

3. Above all, the CFU Climate Smart Agriculture (CSA) has proved to be an efficient and effective initiative since despite adopters cultivating smaller plots than conventional farmers, they harvested more when exposed to the same number of rainy days. It is important that the average number of rainy days for the 2018/19 season was far less than that of 2017/18 which made the hazard even bigger.

Impact Indicator Values - 2019.

This study established the current, May 2019, values for the two impact indicators. Detailed Indicator Values by Zone as well as for the Middle and Better off wealthier groups are found in Annex 1.

Indicator	Wealth Group	Adopting Households	Conventional Farmers
Impact Indicator 1: Proportion of Households above the Survival Threshold (ST)[2]	Very Poor	100%	94%
	Poor	100%	100%
Impact Indicator 2: Proportion of Households above the Resilience/ Protection Threshold[3]	Very Poor	45%	24%
	Poor	95%	36%

Recommendations

The second phase Outcome Analysis study led to the following recommendations at project level.

1. After carrying out two phases of Outcome Analysis one is technically tempted to be conclusive, that conservation arming is better able to build resilience among small holder farmers than conventional farming technologies. It is highly recommended to continue tracking Livelihood outcomes longitudinally using the Longitudinal Impact Monitoring and Evaluation (LIME) concept by carrying out an annual Outcome Analysis using the identified key parameters at Livelihood zone levels under different weather conditions.
2. Within the context and understanding that there were some other assessments which were done on the same program, it will be a good investment to closely look at areas of convergence and divergence in these initiatives which might be methodologically different so as to come up with a richer understanding of the internal workings of the CSA technologies.
3. There is also need to bring a human face to the methodology (evidence from program participants) by employing other methodologies so as to clearly bring out explanations and attributions to the programme. It is hereby that the CFU M&E as well as the Programms department to continue carrying out case studies or the use of the Most Significant Change (MSC) stories be also added to compliment the HEA framework. This qualitative dimension of documenting stories of change will help to explain CSA impacts/ or lack of impacts on the Livelihood of the farmers.

The Conservation Farming Unit should also intensify strategies to mechanise CF so as to help farmers to significantly increase the plot sizes which would lead to higher production

[2] Survival Threshold is the extent to which households are able to meet their basic food energy (2100KCl/person/day) and basic living needs.

[3] Livelihood Protection Threshold is the extent to which households are capable of withstanding a typical set of hazards through continuing to invest in current set of livelihoods without resorting to distress disposal of production assets and do this without falling below the ST.

1. INTRODUCTION AND BACKGROUND

This second phase Outcome Analysis study report presents findings that would help to inform the development (refining) of the Climate Smart Agriculture Zambia (CSAZ) project interventions and specific livelihood strategies in Zambia as the CSAZ moves towards the final phase of programming. The study sought to assess the performance of adopters and non-adopters after going through a similar hazard (in this case a severe drought) against benchmarked indicators. The idea was to establish the extent to which the resilience of the two different groups varied in coping with the effects of the climate related shocks. Field work was undertaken between the 17th and 27th September 2019 in Chongwe, Mazabuka, Choma, Katete and Chipata districts in Zambia as a direct follow up to the baseline and the first round of Outcome Analysis which was compiled for the same places in October 2017 and September 2018 respectively. The report is divided into four sections: The background section provides background information to the Outcome Analysis study including the importance of the Household Economy Analysis (HEA) and how it fits into both the baseline and the Outcome Analysis studies. Thereafter, the study methods describe the approach used, and finally an analysis of the findings. The last part of the report deals with, the conclusion and recommendations are then outlined. This report is structured such that it answers comprehensively all the research questions which are in the assignment Terms of Reference. Annex 3.

1.1 Understanding the CFU Climate Smart Agriculture Project

The Conservation Farming Unit (CFU), is a not-for-profit organization being sponsored by the British Government through the Department for International Development (DFID), under its Climate Smart Agriculture Zambia (CSAZ) Programme, provides trainings to an outreach of over 200,000 farmers annually across four (4) regions: Central, Eastern, Western and Southern. The CSAZ project has 81 Field Officers (FOs) and 10 Senior Field Officers (SFOs) across the four regions. Each FO trains and/or oversees training of about 2,700 farmers three times annually. The majority of trainees of the CFU are small-scale farmers in rural and peri-urban areas of Zambia. These trained farmers are in turn expected to practice minimum tillage through either hand hoe basins, animal draught power ripping, or tractor ripping. Minimum tillage is the most important component of conservation agriculture, and the **only one** that makes it different from all other tillage practices that farmers have been practicing for the past 4 000 years. The farmers who are using MT are referred to as adopters. It is against this understanding that another phase of Outcome Analysis study was commissioned to assess and possibly confirm with some degree of certainty the difference between adopters and non-adopters if exposed to same climatic shocks/hazards. The idea is to be able to get an understanding of how these two groups respond to different shock and hazards.

1.2 The Household Economy Approach

The Household Economy Analysis (HEA) was used for collecting and analyzing field-based livelihood information on Outcome Analysis as a follow up to the baseline information which was compiled in October 2017 and the inaugural Outcome Analysis of September 2018. The baseline study was focusing on the wealth breakdown, seasonal calendar for main events and activities, and the profiling of livelihood strategies, which include sources of food and cash income, expenditure patterns, and household coping strategies. To understand the evolving Livelihoods situation, the baseline assessment identified the period **May 2016 to April 2017** as the reference period, i.e., a year used to describe and quantify occurring Livelihood patterns for households and is used as a benchmark against which changes in future access are measured. Livelihood strategies are a range or a combination of activities that people or households engage in order to achieve household survival goals. These also cover how people manage and preserve assets and how they respond to shocks (i.e. coping or expandability strategies employed). This methodology allows for a holistic approach to understanding the way people live. It provides a good starting point for objectively demonstrating change in people's livelihoods as well as access to food and cash due to multiple changes by allowing analysis of the impact of changes in individual livelihood strategies as well as its contribution to total livelihood access. The 2017 baseline study therefore sets a good platform for the successor studies (Outcome Analysis) which seek to articulate the projected outcome after going through an intervention and/or hazard and employing some coping capacity.

This was therefore a study of the ways through which households are obtaining resources to sustain their Survival with a particular interesting in tracking whether or not these have quantitatively changed from reference year to current with a projection for the current consumption year. The primary purpose of the study was to specifically provide evidence of the difference between Conservation Agriculture (CA) adopters and Conventional farmers (non-adopters) so as to provide and evidence based judgments about whether or not Climate smart agriculture really works for farmers in Zambia.

1.3 The Country Context in which the Project is set

Zambia's Gross Domestic Product has over the past 15 years averaged 5-6%. In 2014 the economy grew at 6% and was projected to grow 7.3% in 2015. GDP capita has risen leading to Zambia being classified as a middle income country. Though the outlook looks favourable, Zambia, like most exporters of primary commodities, is currently going through a difficult patch following the fall in copper prices due to the reduced demand for the commodity in world markets, particularly in China. Whilst inflation and interest rate have more or less remained stable Zambia's currency has plummeted by about 30% against the US dollar since January 2015. This trend which has affected most developing countries' economies is likely to ease with a rebound in the major

economies. However, the positive economic growth has not translated into employment creation or poverty reduction for the majority of the population.

The most recent Labour Force Study (LFS) for 2012 puts Zambia's labour force at 5,966,199, with slightly more than half (51.6%) female. The majority of the labour force (84.6%) is engaged in the informal sector. The formal sector, which is responsible for most of the economic growth, foreign exchange and tax revenues, employs only 15% of the employed labour force. The key sector driving economic growth has been the mining sector, which has remained capital intensive, and the construction industry. The mining sector which contributes 12% of GDP employs only 1.7% of the labour force or 8.3 per cent of total formal sector jobs and around 25 per cent of total private sector formal jobs in 2012.

According to Zambia's CSO data, the mining sector increased its share of GDP from 6% in 2000 to 8% by 2006. The sector that has grown rapidly is the construction sector which is ancillary to the mining industry; construction has grown from 4.9% of GDP in 2000 to 23% in 2012. There is even lesser diversification in the export sector, where the mining and quarrying sector account for 80% of total exports.

Poverty remains high at 60.5% (2010 LMCS) and is more prevalent in rural Zambia. Rural poverty stands at 77.9% compared to 27.5% in urban areas. Income inequality, as measured by the Gini coefficient, has increased from 2004 after a declining trend from 1998. The Gini index fell to 0.57 by 2004 but has since worsened to the present level of 0.65, indicating that Zambia remains among the most unequal countries in the world.

1.4 The Outcome Analysis Study Objectives

The 2019 Outcome Analysis was expected to clearly establish existing food deficits (if any), and then explore whether there are any differences between adopters and non-adopters. Food deficits are based on the 2100 kilocalories required by an individual household member per day for a normal life. Outcome Analysis goes further to establish the proportions of households that are not able to meet their daily energy requirements. This is done using a Household Survival Threshold (ST). The ST is a performance threshold against which the adequacy of household access to food and income can be measured. Households falling below this threshold are classified as facing acute food insecurity (at least IPC Phase 3) and require emergency assistance. The CSAZ project seeks to build the resilience of participating households and this has been measured using the Livelihoods Promotion (LPT). Through this Outcome Analysis, the LPT has been estimated and household at or above this threshold has been computed.

In terms of geographic coverage, our unit of analysis remains the Livelihood Zone (LZ). The Outcome Analysis covered all the 4 LZs that were covered in the HEA Baseline and these are:

- Commercial Rail line Maize, Livestock and cotton – ZM08
- Eastern Plateau Maize, Cotton, and Groundnut - ZM16

- Eastern Plateau Maize, Groundnut, Tobacco and Trade – ZM17
- Southern Plateau Cattle, Maize and Tobacco - ZM09

The actual districts are as shown in Table 1 (adapted from the TORs shared by the CFU). One of the livelihood zones is however vast and a decision was taken to cover two districts in that livelihood zone to get a good and fair representation. Table 1 below shows the 5 districts and it was suggested that for the sake of maintaining a longitudinal perspective, the research team visited the same villages as in both baseline and the first phase of Outcome Analysis assessment to maintain a longitudinal approach.

Table 1: CFU Areas of operation and the Proposed Study areas.

Livelihood Zones in in CFU Region	**District**	**Specific Study dates**
Commercial Rail line Maize, Livestock and cotton – ZM08	Chongwe	16th and 17th Sept
	Mazabuka	23rd and 24th Sept
Eastern Plateau Maize, Cotton, and Groundnut – ZM16	Katete	18 and 19th Sept
Eastern Plateau Maize, Groundnut, Tobacco and Trade – ZM17	Chipata	20th and 21st Sept
Southern Plateau Cattle, Maize and Tobacco – ZM09	Choma	25th - 27th Sept

The baseline study objectives were aimed at providing evidence on the functioning of local livelihoods as a way of guiding appropriate decision making that incorporates context specific needs, particularly the distinction between conservation agriculture adopters and Conventional farmers. These decisions are focused on current and future programming and evidence based policy engagement on food security, livelihoods, nutrition and social protection in CFU operational areas. This second Outcome Analysis was hence a follow up to both the baseline study as well as the first OA. As already stated, it and sought to provide a longitudinal picture of the socioeconomic benefits derived from the CSAZ project at household economy level and track both household and community level resilience and shocks related to the climate's effects on agriculture. This was achieved by seeking to benchmark and create an understanding of any differences between adopting farmers and Conventional farmers.

The CFU engaged technical expertise in the establishment of an HEA baseline and Outcome Analysis to enable the Unit to monitor and evaluate the performance of conservation agriculture under Climate Smart Agriculture (CSA) initiative in Zambia in a longitudinal manner. The HEA provides an analytical framework for understanding strategies employed by households to derive food and income. The Thresholds, are then used to measure the performance of households. For the purposes of this Outcome Analysis study, two relevant impact indicators were to be benchmarked and these are;

- ✓ **Impact Indicator 1:** Proportion of Households above the Survival Threshold (disaggregated by Socio Economic status and adoption status)

- ✓ **Impact Indicator 2:** Proportion of Households above the Livelihoods Protection Threshold (disaggregated by Socio-Economic status and adoption status)

In brief the Outcome Analysis study has achieved the following objectives

- Introduction to **problem specification**- This is a translation of shocks/hazards into economic costs and linking these to baseline data as a way of analysing impact on Livelihood access.
- Identification and **quantification of coping and response strategies** – This is an account of the coping strategies in both analysing and quantifying opportunities and constraint's in responding to any natural and man-made hazards such as conflict, floods, drought and price increases.
- Defining **intervention thresholds**- This now is the stage of defining and quantifying the Survival and Livelihood protection thresholds to be used for determining type and quantity of emergency support required when households both CSA CA adopters and Conventional farmers that do not meet their needs.
- The **final Outcome Analysis** – Carrying out livelihood impact analysis for the four baselines to predict and forecast the food security and livelihoods situation in specific areas. This has helped explain the overall impact of the CA intervention and hazards to ensure the identification of appropriate support interventions in the area.
- **Response Analysis** – The conversion of outcomes into decision making on possible interventions - (translating evidence into action).

The baseline period was for **May 2017 to April 2018** consumption year. The Outcome Analysis follows a systematic step by step process outlined below:

Step 1: ***Identification of "key parameters":*** Key parameters are significant sources of food and income which when access changes will have significant impacts on overall food and income for a household. They are the indicators monitored to conduct Outcome Analysis. Therefore, the first step of this Outcome Analysis was to identify and list these sources of food and income, identified from the baseline information.

Step 2: ***Collecting data for key parameters***: After identification, primary and secondary data was collected on all key parameters.

Step 3: ***Calculating "problem specification":*** This process involved comparing current levels (2018/19 consumption year) of key parameter data to reference year levels (2016/17) – to quantify change (in percentage terms) from reference year. In other words, this process allows analyst to incorporate hazard/shock information into the analysis. This allows to translate the shock into economic consequences at the household level.

Step 4: ***Projecting the outcome:*** lastly, hazard/shock information (problem specification) were applied into the analysis to calculate the projected outcome which shows the impact of the shock on food and income access. The outcomes are measured against two thresholds (Survival and Livelihoods Protection) which are described in detail below in the methodology section (HEA Overview).

1.5 The Conceptual Framework

1.5.1 Household Economy Assessment (Outcome Analysis)

The Household Economy Analysis is a livelihoods framework for analysing the way people obtain access to food, income and expenditure patterns which pertain to their Survival and livelihoods enhancement. The analysis helps determine people's food and non-food needs and identify appropriate means of assistance for short term emergency assistance, longer term development programming and also assist in recommending policy changes to sustain good life. The framework is divided into six steps namely Livelihood Zoning, Wealth Breakdowns, and Livelihood strategies, Problem Specification, Analysis of Coping and the Projected Outcome as illustrated in the figure below:

Figure 1: Conceptual Framework

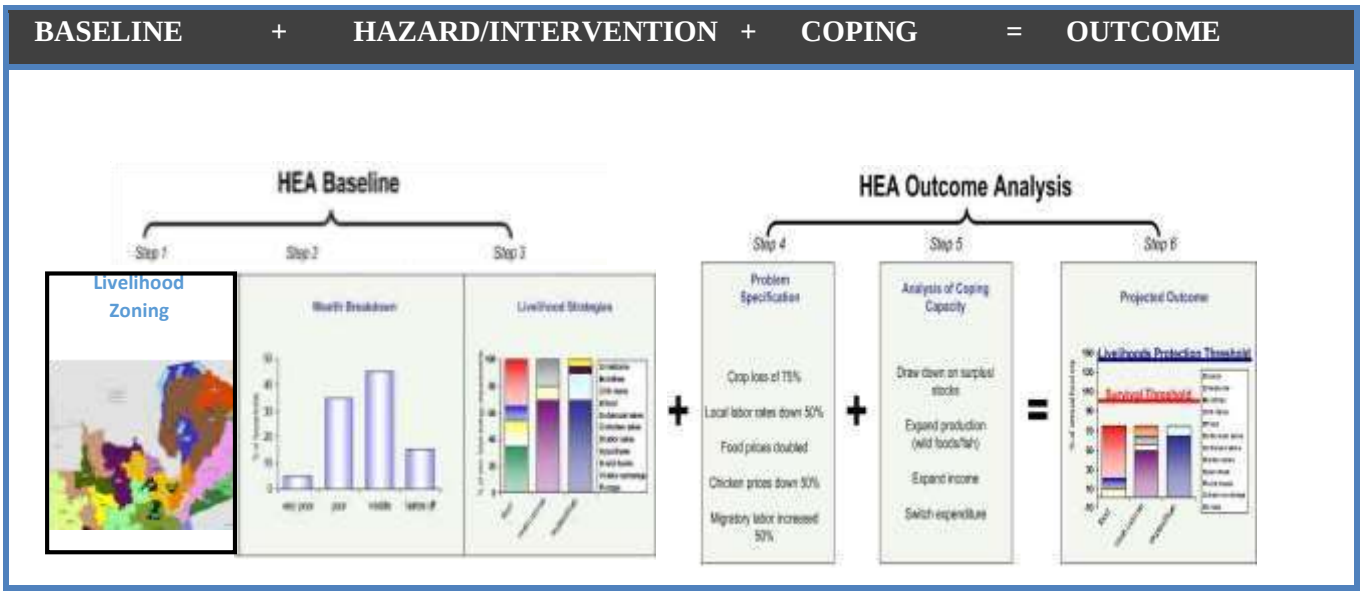


Table 2 below articulates the HEA steps in summary.

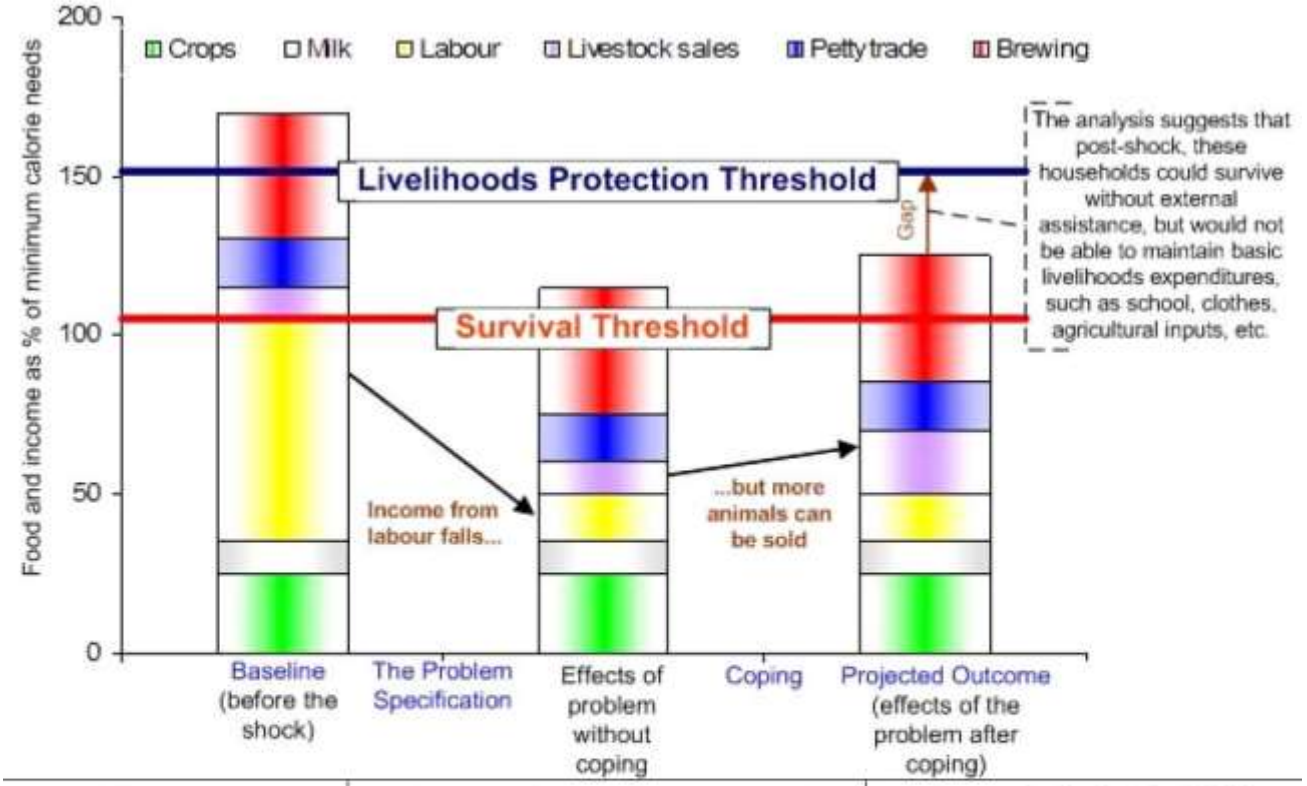
Table 2: Typical Methods Used to Gather Information for the HEA Framework

Step in the Framework		*Information collection methods used (to date)*
Baseline	Livelihood Zoning	Semi-structured interviews; participatory workshops; secondary data review
	Wealth Breakdowns	Semi-structured interviews; proportional piling; census data review (to cross-check household composition)
	Analysis of Livelihood Strategies	Semi-structured interviews; review of secondary data (to cross-check yields, production, livestock numbers, etc.); proportional piling; participatory seasonal calendars and community mapping
Outcome Analysis	Problem Specification	Household surveys (to gather monitoring data such as crop production and prices); Semi-structured interviews; review of secondary information, especially time series data
	Analysis of Coping Capacity	Semi-structured interviews; review of secondary data (on labour markets, herd composition, viable off-take rates, etc)
	Projected Outcomes	No additional information goes into this step; this step comprises an analysis and processing of the data and information gathered in the previous steps

This framework is based on the principle of understanding how people live in normal year which is referred to as the Reference Year. Once a set of data which assesses access to income, food and expenditure is generated at the baseline stage as was done two years ago in October 2017, then changes in access will be assessed in years that follow through collection of problem specifications in Step 4. Problem Specification and analysis of coping are then used to generate the projected outcome which is then compared to the Survival and Livelihood Protection Thresholds.

In the projected outcome, an analysis of Survival and Livelihood Protection Thresholds is undertaken to determine whether or not external assistance is required to support households to meet Survival needs to support their livelihoods. The graph below presents the concepts which start by understanding the situation before a shock (baseline), the situation which is a result of the shock (effect of a shock eg drought) and finally the final picture which takes into account the coping/effects of the Climate Smart Agriculture in Zambia (CSAZ) intervention. The scenarios are analysed in relation to Survival and Livelihood Protection Thresholds (defined below) which are Livelihood zone specific. An analysis of the three bars against the 2 thresholds gives an indication as to whether external support would be required or not.

Figure 2: The Household Economy Analytical Framework – a simplified illustration



The 'y' axis represents food and income as a **percentage of minimum annual calorie requirements**. In short, food and income sources are converted into kilocalories which are then compared to 2100 kcal, which represents the internationally accepted minimum energy requirement per person per day. While overly simplified in this graphic for the purposes of illustration, this is an important concept in HEA because converting food and income into a common currency allows analysts to quantify and make comparisons. See Chapter 3 for more details.

The **first bar** from the left in the chart represents total access to food and income in a reference year for a particular group of people with similar access to food and income. This is the baseline, which presents a picture of the 'typical' household economy: of household assets; the strategies employed to derive food and income and the relationships between households and with the wider economy; and how households use that income to meet their basic needs, for investment or for social obligations. *One important point to make here is that the quantities represented in the bar charts are a percentage of minimum food energy requirements;* all food and income sources have been converted into their calorific equivalencies. This has the advantage of allowing for like-to-like comparisons, and also of ensuring that a rigorous cross-checking can take place. In most instances, HEA uses the measure of 2100 kilocalories - this is not to say that energy alone is a sufficient measure of nutritional adequacy; but it is the first measure of whether or not people will starve. Further nutritional analysis is possible with HEA,

although specific Cost of Diet work is likely to be more appropriate for gaining specific pieces of nutritional information.

The idea is that once the baselines have been compiled they can be used repeatedly for this type of Outcome Analysis over a number of years – until significant changes in the underlying economy render them invalid. A good food economy baseline will generally be valid for between 3 and 10 years. What varies is the prevailing level of food security, but this is a function of variations in hazard, not variations in the baseline. Put another way, the level of crop or livestock production may vary from year to year (hazard), but the underlying pattern of production (the baseline) does not usually change very rapidly.

The **second bar** (middle bar) in the chart – **the effects of the problem without coping -** shows us how specific sources of food and cash income are affected by a shock. In the hypothetical case presented in Figure 2, the shock is a drought in a neighbouring country, leading to an influx of labourers from the drought-affected area in search of work, who flood local labour markets reducing the daily wage. The effects of shocks are specific to different livelihoods and to different levels of wealth, and the detailed problem created by a 'shock' for particular households is defined in HEA as the **'problem specification'**. In the illustrative example provided in Figure 2, the problem specification is shown between bars one and two, and results in reduced income from employment as shown in bar 2. It is worth noting here that HEA can be used to consider the effects not just of negative shocks, but also of positive changes. So, for instance, it is possible to consider just how much extra income might be obtained by poorer households who are provided with two goats, and what this might translate into in terms of increased food security. Or the relative food security benefits of a subsidy on kerosene might be weighed up against a price cap on staple maize.

Third, the framework takes into account household capacity to adapt to the economic stress caused by the hazard by drawing down on assets, cutting back on expenditures, or expanding other sources of food or cash. This is shown in the coping step, which is placed in between the second and third bars above. In this example, households are able to sell more livestock than usual, and this increases their access to food and income. Regarding **coping strategies**, it is not usual to include every possible strategy in the calculation of outcome. This would have the effect of under-estimating the need for assistance as measured by the deficit. Instead, only those strategies that are appropriate responses to local stress are included. In this context, appropriate means both 'considered a normal response by the local population' and 'unlikely to damage local livelihoods in the medium to longer term'. In a pastoral setting, for example, it is usual to increase livestock sales in a bad year. This is an appropriate response to economic stress - provided the increase in sales is not excessive. **An HEA outcome analysis, therefore, determines the level of assistance required to prevent inappropriate coping strategies that would undermine early recovery and longer-term development.** In this regard HEA does not model actual behaviour

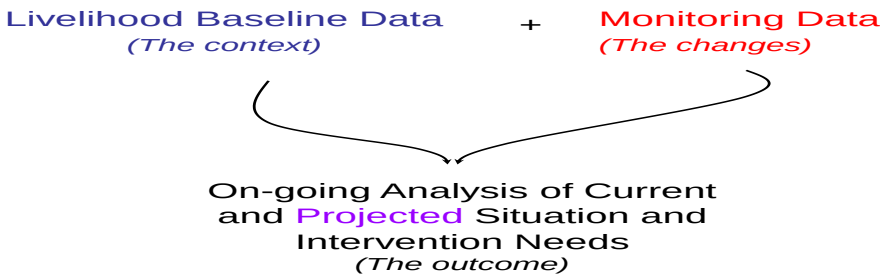
– since in the absence of appropriate levels of assistance households will be forced to employ 'inappropriate' coping strategies.

The final result – the projected outcome – is shown in the **third bar** (extreme right). The projected outcome is, in essence, a consideration of the extent to which households will be able to 1. Meet their basic Survival needs (the Survival threshold) and 2. Protect their basic livelihoods (livelihoods protection threshold). The two horizontal lines shown in Box 1 illustrate these two thresholds. The output from an Outcome Analysis is an estimate of total food and cash income for a projected period, once the cumulative effects of current hazards and income generated from coping strategies have been taken into account.

The next step is to compare projected total income against two clearly defined thresholds – the **Livelihoods Protection Threshold** and the **Survival Threshold** – to determine whether an intervention of some kind is required. The *Survival Threshold* is the amount of food and cash income required to ensure Survival in the short-term, i.e. to cover minimum food and non-food needs. Minimum non-food needs will generally include the costs of preparing and consuming food plus any cash expenditure on water for human consumption. The *Livelihoods Protection Threshold* is the amount of food and cash income required to protect local livelihoods. Besides these essential non-food goods and services, the Livelihood Protection expenditure basket can also contain a number of items that – while not absolutely essential for Survival – can nonetheless be considered essential in terms of sustaining a minimum locally acceptable standard of living (e.g. tea and sugar). The exact composition of the Livelihoods Protection Basket will vary from Livelihood zone to Livelihood zone, depending upon local circumstances.

It should be remembered that the objective of an Outcome Analysis is to investigate the effects of **hazards** (and/or interventions) on future access to **food** and **income** at household level. The framework involves putting together two types of information:

Figure 3: Types of information for OA



In this assessment the evaluation team collected baseline information, with 2017 as the baseline year and 2018 as

the current year. In conducting the HEA baseline it was important to specify the **'reference year'** (also referred to as the baseline year). The reference year is considered 'typical' of the household economy: of **household assets**; the **strategies employed** to derive food and income and the relationships between households and with the wider economy; and how households use that income to meet their basic needs. The Livelihood outcome in the reference year or in subsequent years resulting from a shock, positive event or programme intervention is compared to two thresholds: i) the **Survival threshold** which measures household access to resources necessary to meet their basic needs, and ii) **Livelihood protection** threshold measuring household capacity to maintain access to basic services and protect and sustain livelihoods in the medium and long term. Below is an outline of the key steps in the Household Economy Approach and how this analysis examines the parameters in this assignment.

1.6 The Outcome Analysis Implementation Strategy

The second phase Outcome Analysis assessment was done in four purposively selected Livelihood zones which were covered at baseline level: Commercial Rail Line Maize, Livestock, and Cotton (Chongwe – Mazabuka); Southern Plateau Cattle, Maize and Tobacco (Choma) Eastern Plateau Maize, Cotton and Groundnut (Katete); Eastern Plateau Maize, Groundnut, Tobacco and Trade (Chipata) where CFU climate smart initiative is operational in. These zones were purposively selected on the basis of the CFU coverage of districts in the zones and their accessibility to the assessment teams. The study made use of rapid rural appraisal techniques through holding focus group interviews with community leaders using the baseline defined wealth groups using local determinants and wealth group representatives of identified wealth groups and generate a good understanding of the problem specification – **Very Poor, Poor, Middle and Better Off**. A total of 56 key informant interviews were conducted.

The consulting teams undertook the following steps during this study:

- ✓ **Training:** A training workshop was held on 14th and 15th September with a total of 6 participants. The topics covered included: HEA framework overview, key parameter identification from baseline storage sheet, problem specification, analysis of coping, projected outcome as well as the use Livelihood Impact Analysis Spreadsheet (LIAS). The training had field practice (pre-test) embedded in it to allow better appreciation of the data collection instruments before the actual field work and also expose participants to the actual field work conditions.
- ✓ **Field Work Timing:** The field work was undertaken from 16th – 28th of September 2019. Trained participants were deployed to carry out the assessment with guidance and mentoring from experienced HEA practitioners who led the data collection process providing quality control.

- ✓ **Interviews with Household Representatives**. Wealth group interviews were held with 2 groups (CSA adopters and Conventional farmers. Each group had between 8 to 12 members). There were 5 communities per zone and 5 FGDs per community (consisting of 4 groups of CSA adopters and 4 Conventional farmers). Household representatives provided information on current access to food, cash income and expenditure patterns to facilitate comparison with baseline access. This provided an opportunity for problem specification which is basically a translation of a problem into an economic consequence at household level.
- ✓ **Market Assessment:** The team visited 20 markets in the zone to collect price data and understand market hazards in reference year and current year for triangulation and running of price increase hazard analysis.
- ✓ **Data analysis and Livelihood baseline report compilation**. Data analysis was carried by HEA expert with remote support of research assistants giving guidance on specific field experiences. The process involved developing a typical picture of household Livelihood strategies for respective wealth groups.

2. OUTCOME ANALYSIS STUDY FINDINGS AT LIVELIHOOD ZONE LEVEL

The outcome analysis findings for this phase, like what was done during the first phase are presented at livelihood zone level in order to be able to articulate context specific issues. The first part deals with the general zone description to give context of the area we are dealing with. It should be noted that the agricultural season (2018/19) under review presented another opportunity for comparison of the effect of adverse climatic conditions on rain-fed crop production and household economies. The common factor was drought condition which adversely affected crop and animal production. The intensity of the drought (the hazard) in the season under review (2018/19) was higher than the previous season so this study is making an attempt to see the performance of adopters and non-adopters under adverse conditions. In this regard, the distinguishing variable was therefore the fact that some households deliberately chose to take up Conservation Farming MT (Climate Smart Agriculture) while some opted to remain employing conventional tilling methods. In all Zones under the study this distinction will be used in addition to the wealth grouping of households which was done at baseline compilation level. It is the research team's argument that only the lower wealth groups are highly sensitive to both interventions (tillage methods) and adverse climatic conditions, hence we used only the Very Poor (VP) and Poor (P) households to assess the success or failure of CSA in building resilience like what was done in the first phase so as to longitudinally track the results.

2.1 Key parameters – Problem Specifications

For all baseline level identified key parameters (a source that contributes at least 10% of kcals to one wealth group's total food or income OR at least 5% of kcals to two wealth groups' total food or income). The problem specification allows you to mathematically link the shock (or positive change) to each relevant livelihood strategy in the baseline. The problem is always expressed as a percentage and is calculated as

$$\frac{\textit{Current quantity/price}}{\textit{Reference quantity/price}} \times 100 = \%\ \textit{of reference year}$$

Any problem specification less than 100% indicates a drop in either quantity or price of an item in the current year relative to the baseline year while anything above 100% depicts an increase in quantity or price relative to the baseline.

2.2. Zone 1: The Commercial Railway Line Maize, Livestock, and Cotton (ZM08)

Brief Zone Description: The Commercial Railway Line Maize, Livestock, and Cotton (ZM08) Livelihood zone is located in the central plateau with an altitude ranging between 900-1200 meters above sea level and stretching across the districts of Kazungula, Monze, Mazabuka, Namwala, and eastern parts of Lusaka, Kafue, Chongwe, Chibombo, and Kapiri Mposhi along the main railway line and the well-developed road linking Livingstone through Lusaka to the Copperbelt. The zone falls within agro-ecological Region II, which receives an annual rainfall of 700–1000 mm per annum and is characterized by good soils and climate for agriculture. The soils are moderately to highly fertile sandy loam and clay that are well drained and suitable for a wide range of crops. The temperatures are high towards the start of rains between September and November, with highs ranging from 30-35 degrees Celsius. The dry months of May to July are coolest, with average low temperatures of 16-17 degrees Celsius. Open savanna grasslands and Mopane, Munga, and Miombo woodlands cover the zone. Forest reserves and rivers in the zone provide opportunities for charcoal production and fishing.

This densely-populated zone contains about 55 inhabitants per square kilometer. Land cultivated for food and cash crops averages from 1-3 hectares per household. The Lenje and Tonga are the main ethnic groups. Rain fed and irrigated agriculture using manual labor or animal traction are the primary Livelihood activities, though a number of commercial, mechanized farms dot the zone. The main crops grown include maize, cotton, groundnuts, sweet potatoes, and beans, with minor production of millet and sorghum, primarily for household consumption. The growing season is medium to long, ranging from 100-140 days, which is suitable for maize. Cattle are mostly kept for sale and used as draft power. Other livestock in the zone include goats, pigs, and poultry, and are kept for sale or household consumption.

The zone has generally good physical infrastructure, facilitating market access and trade particularly along the road and railway line linking Lusaka and Livingstone and they cut across the zone. Access to markets is fairly good and mostly focused on the big towns of Lusaka, Kafue, Livingstone, and Kabwe. These markets are located within the zone and provide outlets for most commodities produced in the zone, as well as a steady supply of nonfood items. Good infrastructure and proximity to urban areas generate a strong demand for labor; local laborers work primarily on local farms or as casual labor in urban areas within the zone.

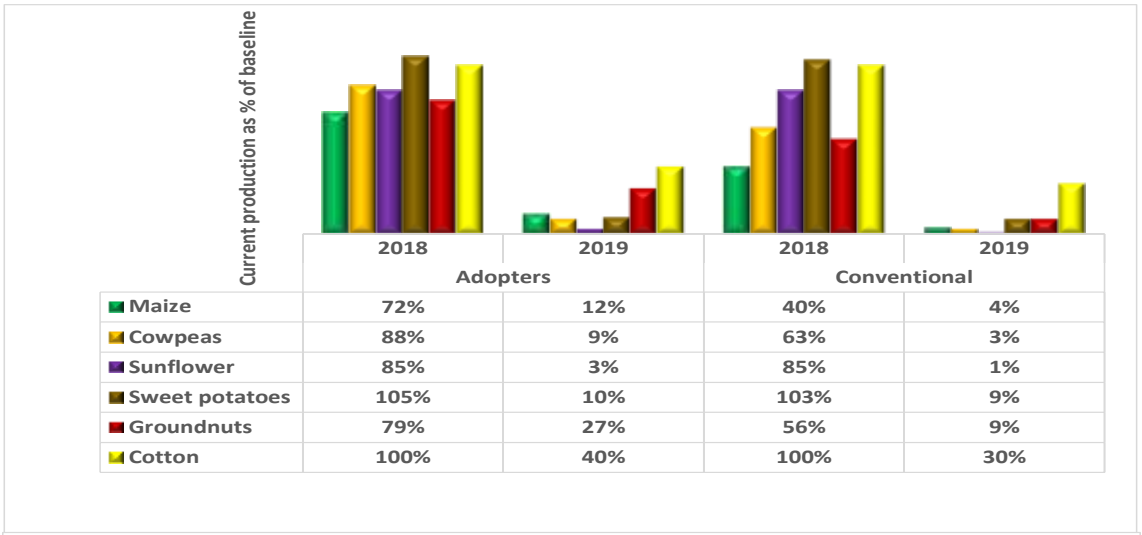
Outcome Analysis results for Zone ZM08

The current year for the Outcome Analysis is May 2018 to April 2019 based on the problem specifications of adopters and non-adopters below. As alluded earlier, a key parameter is a food or income source which contributes at least 10% in wealth group or at least 5% of kcals to two wealth groups' total food or income. The HEA Baseline

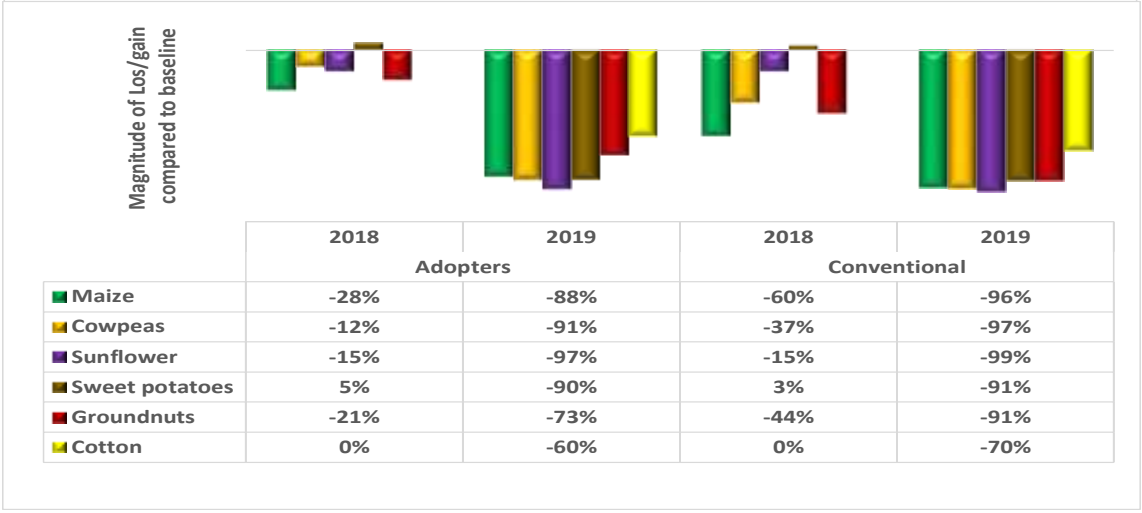
Storage Sheet (BSS) automatically identifies key parameters in the baseline under the Summaries (Summ) worksheet

Figure 4 presents two graphs but both showing the same information; the bottom graph simply flips the information in the top graph by showing the magnitude of change from the baseline (if baseline is taken as 100% then how far from 100% is the current result). Thus, for example, the top graph indicates that in 2018, CSAZ households reported an average harvest of 72% of what it was in the baseline year and this translates to a 28% decrease compared to the baseline year (the second graph then shows this 28% decrease). This is also done for conventional farming households. This whole picture depicts the magnitude of the effect of the unfavourable climatic conditions on the households (problem specification) and disaggregates this effect by adoption status. A close analysis of the graphs will show that, consistently and for all crops, all other factors remaining constant and in the presence of a drought affecting all households, there is a remarkable difference in the way ***the same adverse climatic conditions affect households*** depending on the tillage type that households use.

Figure 4: ZM08 - Overall Problem Specification



	Adopters		Conventional	
	2018	2019	2018	2019
Maize	72%	12%	40%	4%
Cowpeas	88%	9%	63%	3%
Sunflower	85%	3%	85%	1%
Sweet potatoes	105%	10%	103%	9%
Groundnuts	79%	27%	56%	9%
Cotton	100%	40%	100%	30%



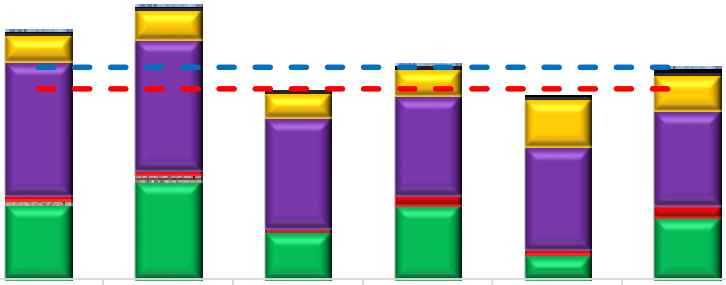
	Adopters		Conventional	
	2018	2019	2018	2019
Maize	-28%	-88%	-60%	-96%
Cowpeas	-12%	-91%	-37%	-97%
Sunflower	-15%	-97%	-15%	-99%
Sweet potatoes	5%	-90%	3%	-91%
Groundnuts	-21%	-73%	-44%	-91%
Cotton	0%	-60%	0%	-70%

Although the effects of drought were quite negative for all farming households in this zone in 2018/19 cropping season CSA adopters experienced comparatively reduced severity than their conventional counterparts. This was mostly seen for maize and groundnuts. The differences between adopters and non-adopters were more pronounced in southern parts of the zone such as in Mazabuka district while in the north eastern part of the zone, Chongwe district, the differences were not as pronounced. On the overall, while CSA adopters suffered an 88% maize crop loss mainly due to drought, conventional farmers lost nearly everything (96%) compared to the baseline year.

A longitudinal perspective paints a grimmer picture for those households that have not adopted CSA technologies. While adopters lost up to 28% in the 2018 maize harvest and this fell to 88% loss in the 2019 harvest, conventional farmers went further down from a maize harvest loss of 60% to 96% loss. Note the greater losses in sweet potatoes and cotton.

A focus on the two thresholds and looked at the VP households in this Zone brought to light a clearer understanding of the effect of the drought on households' access to food and cash and hence the impact of the CSAZ project. Figure 5 graphically summarises the findings as well as tracking results across the years. Note that the threshold lines are as per baseline year.

Figure 5: Total Income (Food + Cash) ZM08 VP



	Conventional	Adopters	Conventional	Adopters	Conventional	Adopters
	VP. Baseline 2017		VP. OA 2018		P. OA 2019	
wild foods/other	1%	1%	1%	1%	1%	1%
firewood/charcoal	3%	2%	2%	2%	3%	4%
self employment	16%	18%	15%	17%	29%	22%
agric. labour	82%	80%	67%	60%	63%	58%
livestock sales	2%	2%	2%	6%	3%	7%
crop sales	2%	4%	0%	0%	0%	0%
crops	46%	60%	29%	45%	15%	38%
LP/Threshold	13%	13%	13%	13%	13%	13%
Surv. Threshold	116%	116%	116%	116%	116%	116%

Figure 5 is a confirmation of what has already been noted in Figure 4; that the impact of the agricultural shock (drought) is less pronounced among the adopters. The major difference between the study samples is whether or not households participate in Climate Smart Technologies as espoused by the CFU. It is clear that CSAZ farmers are marginally cushioned from the vagaries of nature due to the adoption of conservation farming technologies. For conventional farmers, crop production's contribution to household economy has been falling from a baseline figure of 46% to 29% in 2018 to the current 15% in 2019. Adopters on the other hand also suffered these losses but they started with a high of 60% in the baseline year, declining to 45% in 2018 and ending at 38% in 2019. Adopters managed to surpass both the Survival and the Livelihood protection thresholds while the conventional farmers fell below both survival threshold and livelihood protection threshold with deficits of 2% and 15% respectively. The case of non-adopters (conventional farmers) failing to reach the survival threshold in both 2018 and 2019 was not an indication of starvation as the deficit was not very significant but pointed to the failure by these households to have sufficient resources for the cost of preparation of the food to make it more palatable. Remember the Survival Threshold is the total income required to cover 2100 kcals per person per day and the costs associated with food preparation and consumption (i.e. firewood, salt, soap, kerosene, basic lighting) as well as expenditure on water for human consumption. The 2018/19 drought was so severe that normal drinking water sources went dry such that water ceased to be a free commodity.

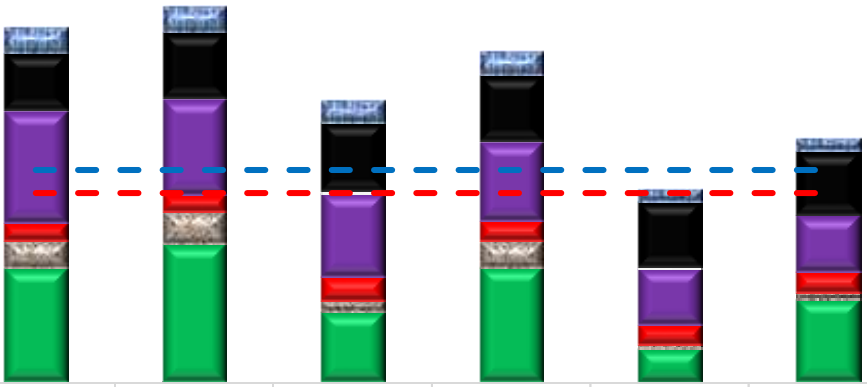
Note that the equation for the thinking here is:

BASELINE + HAZARD/INTERVENTION + COPING = OUTCOME.

It can be noted with confidence that adoption of Climate Smart Agriculture actually cushioned farmers from the negative effects of drought. Note that drought reduced crop production among all farmers but adopters were ***comparatively*** the less affected. One can also argue that ***if there was no drought*** and the Outcome Analysis equation could have been adjusted to:

BASELINE + INTERVENTION + COPING) = OUTCOME, we could have seen more benefits of Conservation Agriculture with adopters achieving far above the Livelihood protection threshold. There is no doubt the drought situation for 2017/18 and 2018/19 actually subdued the benefits CFU sponsored conservation farming. This is what always happens to crops during prolonged dry spells - irresepctive of the tillage or cropping practices In fact, the LIAS has s stronger case for the argument that while both conventional and adopters are building their asset base, asset accumulation in the absence of drought is more magnified among adopters than it is among conventional farmers. These assets would then be used as buffers for shocks and hazards without necessarily disturbing the normal livelihoods of the farmers.

Figure 6: Total Income (Food + Cash) ZM08 Poor



	Conventional	Adopters	Conventional	Adopters	Conventional	Adopters
	P. Baseline 2017		P. OA 2018		P. OA 2019	
wild foods/other	16.0%	16.0%	13.6%	14.8%	8.0%	8.0%
firewood/charcoal	35.5%	40.8%	42.4%	40.8%	40.0%	39.0%
self employment	0.5%	0.5%	1.4%	0.5%	1.4%	0.5%
agric. labour	69.5%	59.0%	51.1%	49.1%	35.0%	35.0%
livestock sales	10.7%	10.7%	14.9%	12.4%	12.0%	13.0%
crop sales	17.1%	20.1%	7.1%	16.3%	2.4%	4.5%
crops	70.0%	85.0%	43.4%	71.0%	21.0%	51.0%
milk	1.3%	1.3%	1.0%	0.9%	0.7%	0.9%
LP/Threshold	14%	14%	14%	14%	14%	14%
Surv. Threshold	118%	118%	118%	118%	118%	118%

A similar picture also emerges from an analysis of the household economies of farmers belonging to the "Poor" category. Figure 6 shows that after the prolonged exposure to a shock/ drought, although Poor households (both adopters and Conventional famers) in this zone still managed to surpass the Survival threshold and the Livelihood protection threshold the impact of drought was different between adopters and the non-adopters. The differences between the two sets of farmers (adopters and Conventional) farmers is, as expected, mainly accounted for through both crop production and sales levels. For Conventional farmers, because of the hazard/drought, there was some significant drop in crop production particularly maize production from a high of 70% at baseline level down to 21% (accounting for a 49% drop) of household food and income. On the other hand, as much as adopters were affected by the drought, the drop in crop production was not as huge as was the case among conventional farmers. The adopters experienced a drop of 34% from baseline because of the same drought which was experienced in 2018/19 production season. Coping strategies employed by both adopters and non-adopters are an increase in casual labour (though agriculture labour opportunities were reduced because of the drought) and charcoal production which was increased by at least 5% by the Conventional farmers. Note that under Climate Smart Agriculture, charcoal production (which was marginally on the increase compared to the baseline values) is actually a negative coping strategy which should be avoided as it leads to environmental degradation. It rose

by a 4.5 percentage points from a low of 35.5 at baseline to the current level of 40% among conventional farmers. Interestingly, charcoal production fell from a high of 40% among Adopters to a low of 39% across the seasons. Even though not much can be significantly concluded, the rise among conventional farming households does not do much to show climate friendly consciousness among such households.

2.3. Zone 2: The Southern Plateau Cattle, Maize and Tobacco~ ZM09

The zone is located in the districts of Kalomo and Choma. The zone lies on a highland over 1000 meters above sea level bordered by low-lying areas moving towards Gwembe to the east and plains of the Kafue basin in the north. The zone is located within agro-ecological Region II, and receives an annual rainfall of 600–800 mm per annum falling between November and April. The average high temperatures are highest towards the start of rains between September and November, ranging from 30-35 degrees Celsius. Temperatures are lowest during the dry months between May and July with an average low ranging from 16-17 degrees Celsius. The soils are moderately to highly fertile, sandy loam that are well drained to moderately leached, which is good for tobacco production. The main vegetation consists of Miombo woodland forests and open-grasslands that are good for pasture.

The zone is moderately populated with 26 people per square kilometer, and land cultivated averages 8 hectares per household. Most land is used for growing of food and cash crops on a commercial scale. The main ethnic group in the zone is Tonga. The high prevalence of large landholdings for commercial production cultivated using draft power or by tractor, as well as the production of tobacco instead of cotton, distinguish this zone from the surrounding Commercial Rail Line Maize, Livestock, and Cotton Zone (Zone 8). Rain fed and irrigated, commercial cropping using draft power or mechanization drives the economy of the zone. The main crops grown include maize, tobacco, groundnuts, and beans. The growing season ranges from 100-140 days during the rainy season from November to April. Households keep some livestock in the zone for sale or for draft power. The amount of land cultivated, livestock owned, and productive assets are key factors that differentiate the wealth groups. The Poor households rely on own crop production and market purchase while the better-off, who have better production capacity, rely on own production throughout the year. The Poor obtain income primarily from the sale of small livestock, selling own labor, charcoal production, and, to a lesser extent, brewing and wild foods sales. Better-off households mainly rely on crop, livestock, and livestock product sales.

The zone has generally good infrastructure for markets and trade. Access to markets is good and mostly localized with the big towns located within the zone providing markets for most commodities produced in the zone and as supply markets for nonfood items. The largely localized labor market is either on farm or in urban areas within the zone. The main hazards are climate-related with at least one year in every three years being a bad year. Because coping strategies of Poor households are relatively successful at mitigating any production or income losses, the risk of food insecurity in the zone is relatively low.

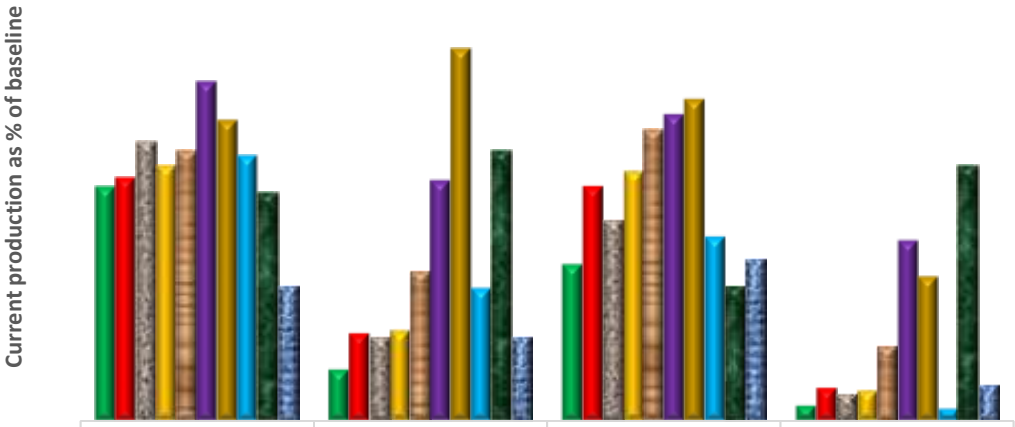
Outcome Analysis results for Zone ZM09

The problem specification (see Figure 7 below) for The Southern Plateau Cattle, Maize and Tobacco~ ZM09 Livelihood zone shows that while for the CA adopters there was a fall in maize production by 83%, Conventional

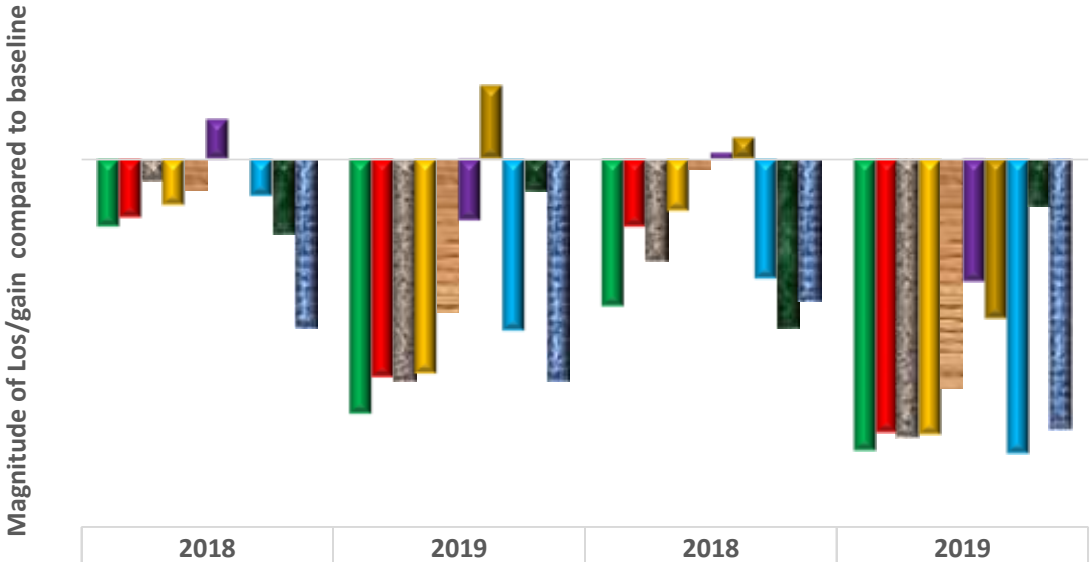
famers have experienced a maize production drop of a whopping 95% in the current year compared to the baseline year. Sorghum and Millet have experienced at least 71% drop in production for CA adopters while Conventional famers suffered at least 72% drop in production. Once more, the effect of drought on CSA adopters is comparatively less severe than it is on Conventional farmers.

The hazard (severe drought) of 2018/19 season coupled with reduced both local and agriculture labour had the greatest impact on Very Poor Conventional farmers who then failed to achieve both the Survival and Livelihood protection threshold leaving the with both survival and livelihood protection deficits.

Figure 7: ZM09 - Overall Problem Specification



	Adopters		Conventional	
	2018	2019	2018	2019
Maize	78%	17%	52%	5%
Sorghum	81%	29%	78%	11%
Millet	93%	28%	67%	9%
Cowpeas	85%	30%	83%	10%
Beans	90%	50%	97%	25%
Sunflower	113%	80%	102%	60%
Sweet potatoes	100%	124%	107%	48%
Groundnuts	88%	44%	61%	4%
Vegetables	76%	90%	45%	85%
Soya beans	45%	28%	54%	12%

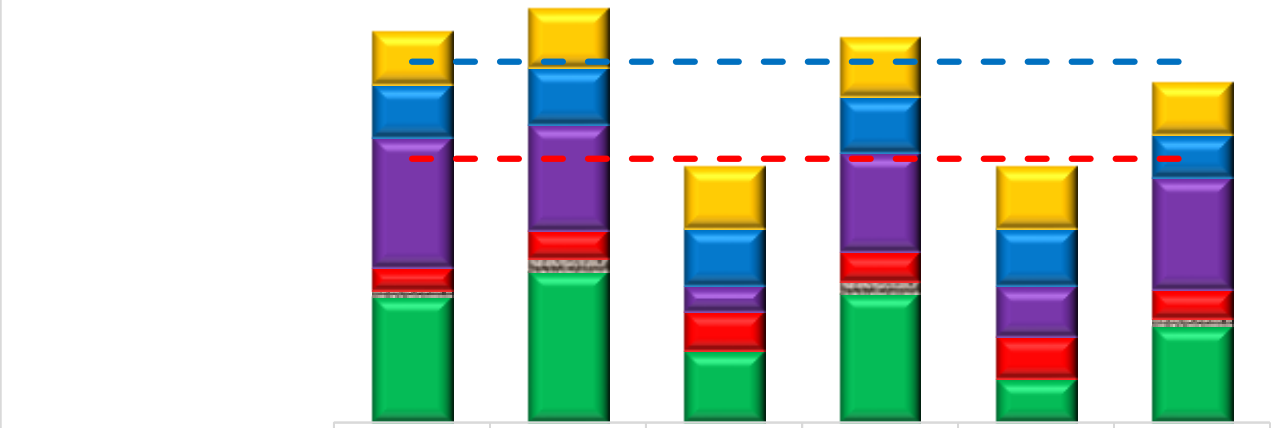


	2018	2019	2018	2019
	Adopters		Conventional	
Maize	-22.00%	-83.00%	-48.00%	-95.00%
Sorghum	-19.00%	-71.00%	-22.00%	-89.00%
Millet	-7.00%	-72.00%	-33.00%	-91.00%
Cowpeas	-15.00%	-70.00%	-17.00%	-90.00%
Beans	-10.00%	-50.00%	-3.00%	-75.00%
Sunflower	13.00%	-20.00%	2.00%	-40.00%
Sweet potatoes	0.00%	24.00%	7.00%	-52.00%
Groundnuts	-12.00%	-56.00%	-39.00%	-96.00%
Vegetables	-24.00%	-10.00%	-55.00%	-15.00%
Soya beans	-55.00%	-72.00%	-46.00%	-88.00%

Figure 7 shows that there in the past two seasons after the baseline (from the longitudinal approach), crop production has been on a downward trend. While, for example, there was only a 22% drop in maize production among adopters of CSA, and a 48% drop among conventional farming households, the last season saw greater loss. Adopters dropped as low as 83 percentage points from maize production compared to the baseline while conventional farming households fell as low as 95% below the baseline production level. Indeed, both production systems suffered a heavy knock from the baseline level, but it is clear that, by comparison, adoption of CSAZ technologies provides farming household economies with an added protection from adverse climatic conditions. This is the same point that will be repeated in virtually all the Zones.

Figure 8 below takes a look at the two impact level indicators; the Survival Threshold and the Livelihood Protection Threshold. Very Poor Conventional farming households suffered a 37% drop in the contribution of crop production to household economy while their adopting counterparts were cushioned by the CFU climate smart initiatives which reduced the impact of drought on crop production by 25%.

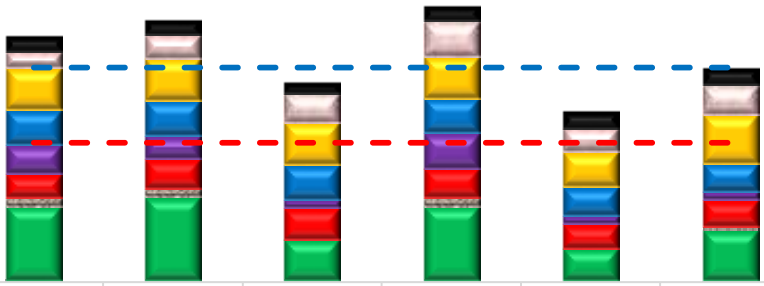
Figure 8: Total Income (Food + Cash) ZM09 Very Poor



	Conv	Ado	Conv	Ado	Conv	Ado
	VP. Baseline 2017		VP. OA 2018		P. OA 2019	
self employment	24%	27%	28%	27%	28%	24%
local labour	24%	25%	26%	25%	26%	19%
agric. labour	59%	48%	12%	45%	23%	51%
livestock sales	10%	13%	18%	13%	19%	13%
crop sales	3%	5%	0%	5%	0%	3%
crops	57%	69%	32%	59%	20%	44%
LP/Threshold	44%	44%	44%	44%	44%	44%
Surv. Threshold	119%	119%	119%	119%	119%	119%

It can be seen that because of reduced harvests, the Very Poor farmers who had significant food and income from agriculture labour did not enjoy the same in the current agricultural season 2018/19 because both weeding and harvest casual labour opportunities were drastically reduced though they could do some planting. Very poor conventional households had to resort to increasing livestock sales as well as sources for non-agriculture local labour so as to reduce their survival deficits. Of course, the survival deficits of the Very Poor conventional famers is not an indication for direct starvation since the deficits are still with acceptable levels acknowledging that the requirement of 2100 kilocalories is the average across a population and over time such that if a person gets around 1900 kilocalories, they will still survive without necessarily starving.

Figure 9: Total Income (Food + Cash) ZM09 Poor



	Conventional	Adopters	Conventional	Adopters	Conventional	Adopters
	P. Baseline 2017		P. OA 2018		P. OA 2019	
firewood/charcoal	14%	14%	10%	14%	15%	15%
petty trade/small business	14%	20%	25%	30%	20%	25%
self employment	36%	36%	36%	36%	30%	42%
local labour	30%	30%	30%	30%	25%	24%
agric. labour	25%	20%	7%	30%	7%	7%
livestock sales	20%	25%	27%	25%	21%	23%
crop sales	7%	7%	0%	7%	0%	3%
crops	64%	72%	35%	64%	28%	44%
milk	2%	2%	2%	2%	1%	1%
LP/Threshold	65%	65%	65%	65%	65%	65%
Surv. Threshold	119%	119%	119%	119%	119%	119%

In Southern Plateau Cattle, Maize and Tobacco~ ZM09 Livelihood zone, while both Poor Conventional and adopters managed to achieve the Survival threshold, the Livelihood Impact Analysis Spreadsheet results showed that the Conventional farmers had a Livelihood protection deficit because their reduced coping capacity to deal with the effects of the severe drought that characterised the 2018/19 cropping season. The presence of a livelihood protection deficit means the conventional farmers have no capacity to maintain access to basic social services (routine medical, schooling) and also cannot efficiently and effectively maintain productive activities in the medium to longer term (agricultural inputs, vet drugs, etc.) without some external assistance. The appropriate intervention to cover the livelihood protection deficit would be a direct cash transfer or provision of a subsidy to social services or agriculture inputs while the adopters were able to meet the livelihood protection threshold because better crop harvest assisted by the conservation farming technology.

2.4. Zone 3: Eastern Plateau Maize, Cotton and Groundnut (ZM16)

The zone covers Northern parts of Nyimba, Petauke, Katete, and parts of Chadiza Districts along the eastern plateau on the border with Mozambique. It is a highland zone with an altitude measuring 1000-1200 meters above sea level. The zone is located within agro ecological Region II and receives an annual rainfall of 800-1000 mm falling between November and March. Temperature extremes range from an average minimum of 15 degrees Celsius during the winter months of May to July, to an average maximum of 35-40 degrees Celsius during the hot, summer months of September and October. The generally sandy, loamy, strong clay soils are fertile and suitable for crops and growth of pasture for livestock grazing. Miombo woodlands, bush shrubs, and savannah grassland make up the vegetation in the zone. Important natural resources include forest reserves, seasonal and perennial rivers, and thatching grass. The zone also contains green tourmaline and emeralds.

Population density is high in the zone with 37 people per square kilometer and average landholding of 3-5 ha per household used for cropping. The main ethnic groups include Chewa, Ngoni, Nsenga, and Kunda. Livelihoods in this zone are based on rain fed agriculture using manual labour and draft power, supplemented by livestock rearing and petty trade.

Land ownership and capacity utilization, livestock ownership, and access to productive equipment are the basis for differences in how households obtain their food and cash in a year. Maize and groundnuts are the most common crops, and contract-farming arrangements with cotton companies' supports cotton production. Goats are the main livestock reared, though pigs are also common. Cattle are typically owned by Poor, Middle and Better off households. All livestock are typically kept on free range. Other sources of livelihoods include limited activities in timber, handicrafts, and fish trade with Mozambique.

Own-produced maize is the primary source of food for all households, lasting between seven and nine months out of the year depending on wealth group. Typically, all households purchase staple food from the market for the remainder of the year. Market purchases of rice also play an important role for better-off households throughout the year, with both groups supplementing their diets with products from goats, pigs, and chickens – most of which comes from own production.

The most important source of cash for all households was the sale of crops. Better-off households also engage in formal employment, trading, and/or services (transport hire, etc.). Poor households earn additional income from vegetable sales, selling wild food and handicrafts, and brewing beer.

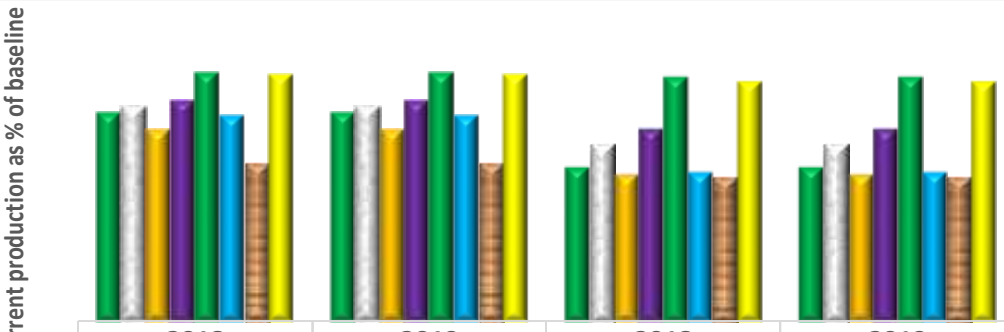
Road and communication infrastructure in this zone is good. For example, the Great East Road linking Lusaka and Chipata passes through the zone, linking markets and providing opportunities for roadside marketing. The proximity to Mozambique border offers a variety of opportunities for cross-border trade and labour exchange. A significant share of agricultural production in this zone is destined for large-scale or commercial trade. Most

households sell maize to FRA, which then re-supplies the households during the lean season. COMACO is the main buyer for groundnuts. NWK Agri-Services, Cargill, and Olam buy cotton.

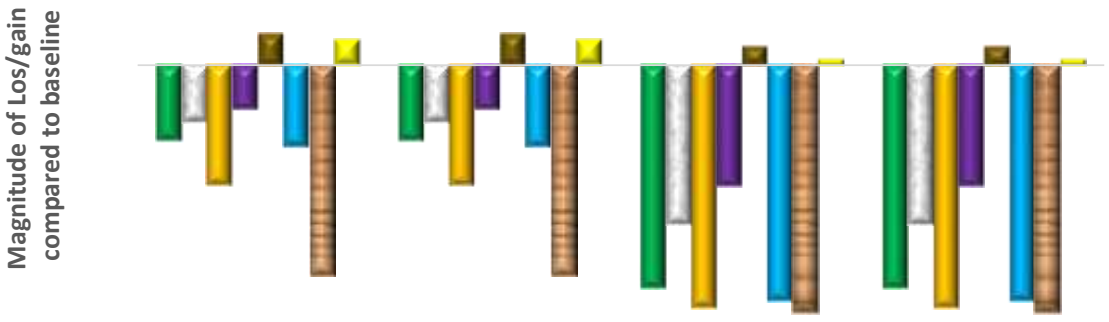
Outcome Analysis results for Zone ZM16

The problem specification for this Zone (ZM16) maintains the same narrative of the effects of drought on crop production as in the other two zones as already articulated above although the intensity of the drought was less as compared to the southern part. In the Eastern Plateau Maize, Cotton and Groundnut (ZM16), which is mainly Katete district; for CA adopters there was a fall in maize production by 52% while Conventional famers have experienced a maize production drop of (64%) in the current year compared to the baseline year. This magnifies the conclusion that the effect of drought on CSA adopters is comparatively less severe than it is on Conventional farmers. Because of the drought, step 4 of the HEA framework (Problem Specification) showed that there was a drop in the production of most crops particularly groundnuts, cow peas and soya beans but of interesting to note is the fact the drop in crop production was more pronounced in conventional farmers. Figure 10 below summarises the problem specifications.

Figure 10: ZM16 - Overall Problem Specification



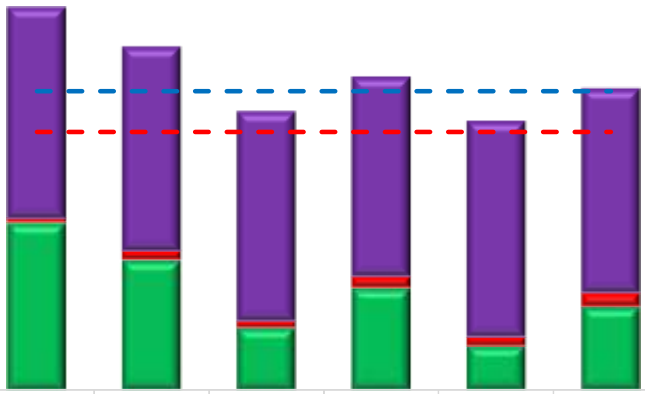
	Adopters		Conventional	
	2018	2019	2018	2019
Maize	88%	88%	65%	65%
Rice	91%	91%	75%	75%
Cowpeas	81%	81%	62%	62%
Sunflower	93%	93%	81%	81%
Sweet potatoes	105%	105%	103%	103%
Groundnuts	87%	87%	63%	63%
Beans	67%	67%	61%	61%
Cotton	104%	104%	101%	101%



	2018	2019	2018	2019
	Adopters		Conventional	
Maize	-12%	-12%	-35%	-35%
Rice	-9%	-9%	-25%	-25%
Cowpeas	-19%	-19%	-38%	-38%
Sunflower	-7%	-7%	-19%	-19%
Sweet potatoes	5%	5%	3%	3%
Groundnuts	-13%	-13%	-37%	-37%
Beans	-33%	-33%	-39%	-39%
Cotton	4%	4%	1%	1%

In the Eastern Plateau Maize, Cotton and Groundnut (ZM16) Livelihood zone, the Very Poor households have limited Livelihood options such that there is, as was seen in the baseline high dependence on crop production and agriculture labour for both food and income.

Figure 11: Total Income (Food + Cash) ZM16 Very Poor

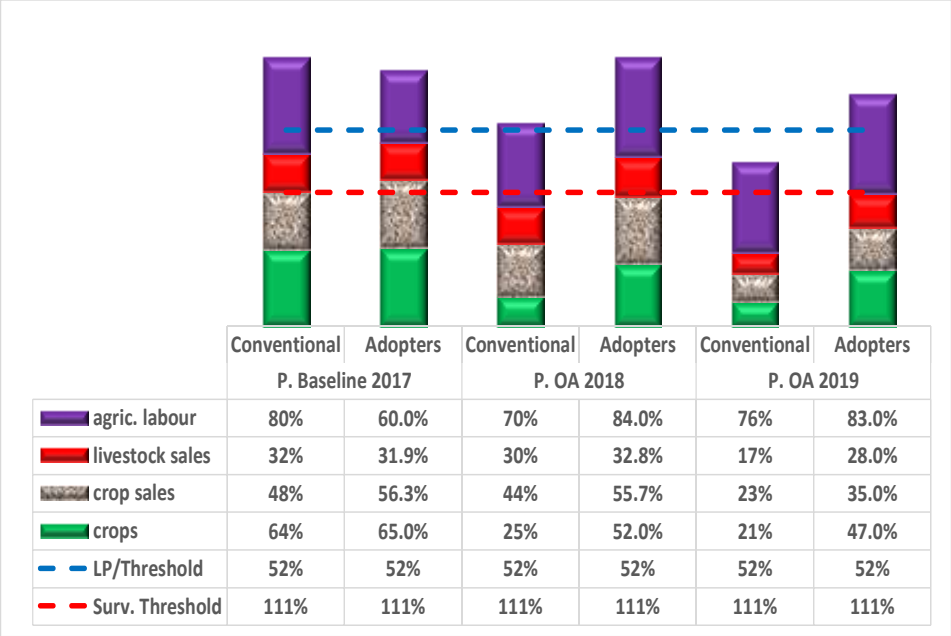


	Conventional	Adopters	Conventional	Adopters	Conventional	Adopters
	VP. Baseline 2017		VP. OA 2018		P. OA 2019	
agric. labour	91%	88%	91%	86%	93%	88%
livestock sales	2%	4%	3%	5%	4%	6%
crops	72%	56%	27%	44%	19%	36%
LP/Threshold	18%	18%	18%	18%	18%	18%
Surv. Threshold	111%	111%	111%	111%	111%	111%

Although in the baseline both Very Poor adopters and non-adopters managed to achieve both Survival and Livelihood protection threshold at varying levels, the non-adopters could not achieve the Livelihood protection threshold after the hazard. It is important to note the achievement of the Survival threshold by both groups in the current season (2018/19) still remained

precariously premised on the availability agricultural labour. It was noted in the baseline that VP conventional farmers had more contribution from own crops towards total household food and cash. The shock of a drought clearly reversed this as seen in Figure 11 as the Conventional farmers were hard hit while the CSA clearly cushioned by the effect of the same shock on Adopters. The continuance of drought continued to reduce the contribution of own crop production on both farmers but the reduction was heavier on non-Adopters.

Figure 12: Total Income (Food and Income) ZM16 Poor



	Conventional	Adopters	Conventional	Adopters	Conventional	Adopters
	P. Baseline 2017		P. OA 2018		P. OA 2019	
agric. labour	80%	60.0%	70%	84.0%	76%	83.0%
livestock sales	32%	31.9%	30%	32.8%	17%	28.0%
crop sales	48%	56.3%	44%	55.7%	23%	35.0%
crops	64%	65.0%	25%	52.0%	21%	47.0%
LP/Threshold	52%	52%	52%	52%	52%	52%
Surv. Threshold	111%	111%	111%	111%	111%	111%

An analysis of the Poor households in the Eastern Plateau Maize, Cotton and Groundnut (ZM16) Livelihood zone, both Conventional farmers and adopters achieved the Survival as well as the Livelihood protection threshold in the baseline although the contributions of crop production and sales were drastically reduced in the 2018/19 season because of the impact of drought. Again, in the baseline, contribution of own crop production to the household economy of households among the Poor Wealth group was almost the same. But the hazard in the current year changed that as well. Conventional farmers were realised to be more prone to the vagaries of nature than Adopters. What is of interest is the fact that, (and this has been consistent across zones) the intensity of the crop loss due to the shock tends to be more vicious amongst Conventional farmers than among adopters. This then underscores the same conclusion already reached in other zones; when faced with a typical shock (in this case a drought), adopting households tend to be more resilient than conventional farming households.

2.5 Zone 4: Eastern Plateau Maize, Groundnut, Tobacco and Trade (Chipata) ~ ZM 17

This Highland (1000-1500 meters above sea level) zone on the eastern plateau covers Chipata, Lundazi, southern parts of Chama, and parts of Vubwi Districts along the border with Malawi. The zone lies in agro-ecological region II, with average annual rainfall ranging from 800-1,000 mm per year, falling from November-April, the main growing season. Temperatures range from a minimum of 11-19 degrees Celsius in June to a maximum of 25-30 degrees Celsius in October. The sandy loam and clay loam soils are good for crop production and support open Miombo woodland vegetation. The zone also has aquamarine and emerald deposits.

The population is more concentrated along the main roads than in the interior parts of the zone. The average population density for the zone is about 26 people per square kilometer with relatively moderate landholding averaging 2 ha per household. The main ethnic groups include Chewa, Tumbuka, Ngoni, Senga and Kunda. Livelihoods in the zone are predominantly based on crop and livestock production. Agriculture is mainly rain fed, with animals used for draught power. Mechanized agriculture is insignificant in this zone. The high rainfall, long growing season (100-150 days), and the fertile soils are favorable for production of maize, tobacco, cotton, and groundnuts. Beans are grown at a small scale. Dams and rivers provide the main source of water for communal livestock that includes goats and cattle. Trade with Malawi is important as it provides opportunities for exchange of agriculture products and labour.

Land and livestock are the main wealth determinants. Better-off households own a wide range of livestock, including cattle, goats, pigs, chickens, and domesticated doves. Poor households' livestock ownership is limited to some goats and chickens. In addition to crop and livestock sales, the better-off also obtain income through trade. The Poor rely primarily on the sale of their labour, some livestock sales, and beer sales for cash. The better off households rely on their own production of maize throughout the year, as well as groundnuts and sweet potatoes seasonally. Poor households rely on own-produced maize from March-August and purchases or in-kind payments for the rest of the consumption period. In return, Zambians get *chitenge*, groceries like *sobo* orange juice, and tea.

Market access is good due to a comparatively good road network linking Chipata and Chama with a number of secondary roads connecting to the main road and Malawi border, facilitating an easy movement of goods and services. Households sell tobacco to private companies, maize to FRA, and groundnuts mainly to COMACO and some private traders. Trade with Malawi mainly concerns tobacco, maize, fish, and livestock.

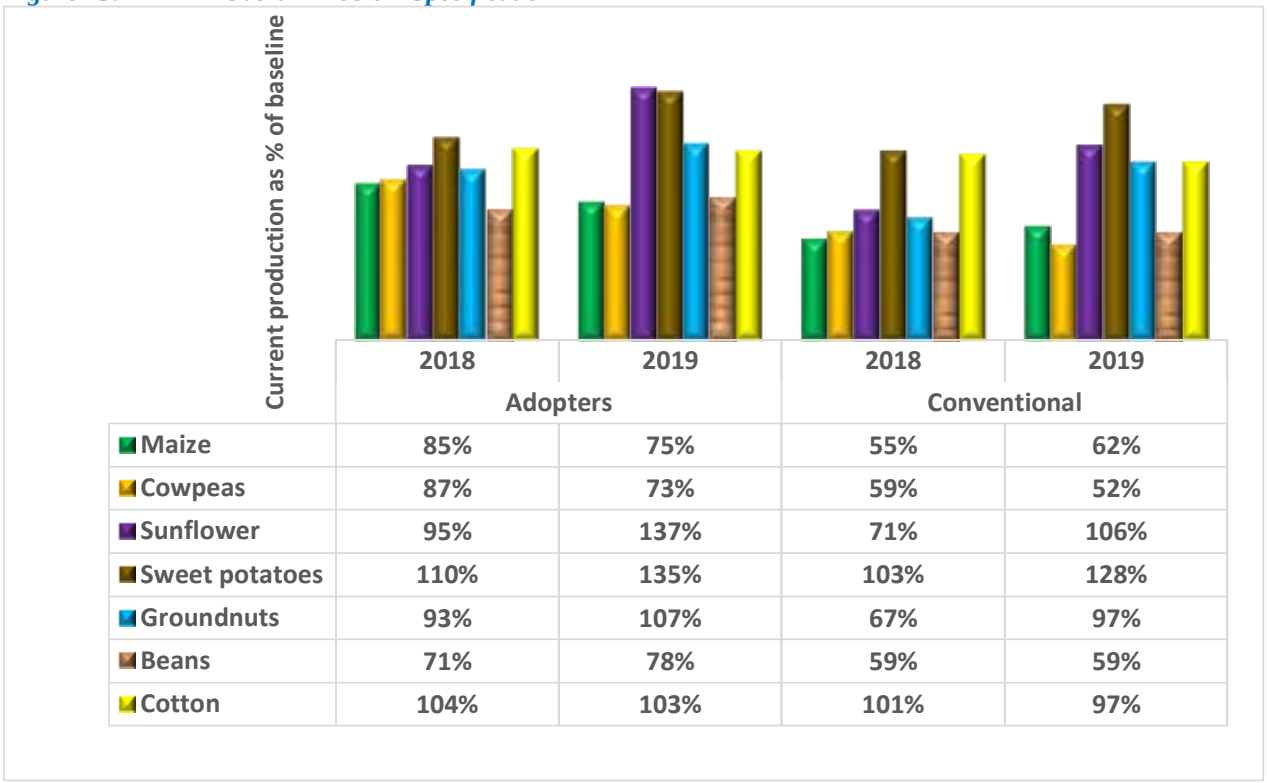
In years of poor agriculture performance, poor households usually intensify the search for casual labour opportunities, providing labour to richer households within the zone or migrating to towns. These poor

households may actually prioritize working for others to earn cash or food in kind over working in their own fields, thus potentially reducing area planted and hence average household production.

Outcome Analysis results for Zone ZM17

Figure 13 below shows and repeats what has already become a truism. The problem specification for this Zone (ZM17) keeps the same narrative of the effects of drought on crop production as in the other three zones already presented above and this corroborates the conclusion that the effect of drought on CSA adopters is comparatively less severe than it is on Conventional farmers. It was of interest to note also that the climate smart conservation agriculture adopters reduced the size of the land they were cultivating particularly for maize, groundnuts and cowpeas whilst the conventional farmers have actually increased the size of land area cultivated. The difference in maize and cowpeas production is clear testimony of the efficiency and effectiveness of conservation farming particularly in this part of the country; Chipata district where the drought situation was not as severe as other areas in Zambia.

Figure 13: ZM17 - Overall Problem Specification

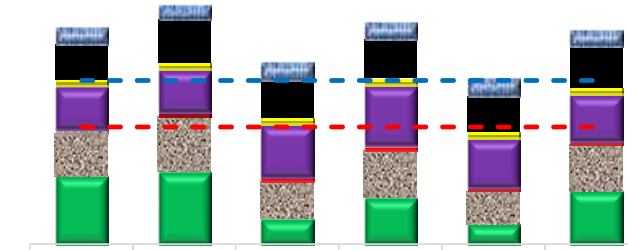


	Adopters		Conventional	
	2018	2019	2018	2019
Maize	85%	75%	55%	62%
Cowpeas	87%	73%	59%	52%
Sunflower	95%	137%	71%	106%
Sweet potatoes	110%	135%	103%	128%
Groundnuts	93%	107%	67%	97%
Beans	71%	78%	59%	59%
Cotton	104%	103%	101%	97%

	2018	2019	2018	2019
	Adopters		Conventional	
Maize	-15%	-25%	-45%	-38%
Cowpeas	-13%	-27%	-41%	-48%
Sunflower	-5%	37%	-29%	6%
Sweet potatoes	10%	35%	3%	28%
Groundnuts	-7%	7%	-33%	-3%
Beans	-29%	-22%	-41%	-41%
Cotton	4%	3%	1%	-3%

In the Eastern Plateau Maize, Groundnut, Tobacco and Trade (Chipata) ~ ZM 17 livelihood zone drought had a negative impact on both crop production and sales in the 2018/19 cropping season and a close analysis the impact of drought was less among adopters when compared to Conventional which shows the use of climate smart technologies proved to have cushioning effect on the farmers. However, Conventional farming households and adopters managed to achieve both the Survival and the Livelihood protection threshold which is very positive from a programming perspective.

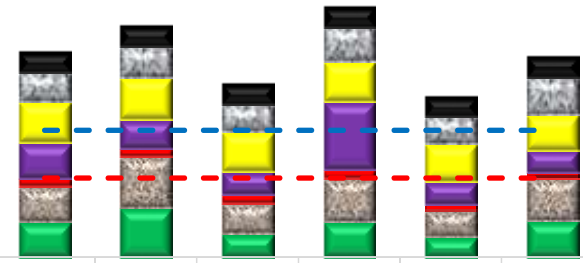
Figure 14: Total Income (Food and Income) ZM17 Very Poor



	Conv	Ado	Conv	Ado	Conv	Ado
	VP. Baseline 2017		VP. OA 2018		P. OA 2019	
firewood/charcoal	18%	16%	20%	18%	19%	18%
petty trade/small business	36%	44%	38%	40%	36%	42%
local labour	7%	7%	7%	7%	7%	7%
agric. labour	44%	44%	54%	63%	51%	48%
livestock sales	4%	4%	4%	4%	3%	3%
crop sales	44%	56%	38%	49%	34%	48%
crops	70%	75%	26%	48%	21%	55%
LP/Threshold	48%	48%	48%	48%	48%	48%
Surv. Threshold	121%	121%	121%	121%	121%	121%

The same trend that was seen in the other 3 livelihood zones; where the adoption of Climate Smart Agriculture (CSA) had some cushioning effect on farmers against the effects of drought, is once more seen here. The same conclusion in reached; in the presence of a typical shock, even Very Poor adopters are comparatively more resilient than their Very Poor Conventional farming counterparts. Both adopters and the non-adopters however managed to achieve the survival and livelihood protection threshold. This was also enabled by the fact the intensity of the drought situation was less in Chipata. Actually, some areas in Chipata experienced some floods in the 2018/19 cropping season. In fact, compared to other zones, this zone had the highest number of rainy days as evidenced by was come out of September 2019 CFU Outcome Analysis Assessment Form in Annex 3.

Figure 15: Total Income (Food and Income) ZM17 Poor



	Conv	Ado	Conv	Ado	Conv	Ado
	P. Baseline 2017		P. OA 2018		P. OA 2019	
Small business	33%	33%	33%	33%	31%	34%
Petty trading	44%	46%	40%	52%	42%	56%
local labour	62%	65%	62%	62%	58%	55%
agric. labour	54%	44%	35%	104%	35%	34%
livestock sales	13%	13%	13%	13%	9%	9%
crop sales	54%	78%	46%	66%	40%	65%
crops	54%	75%	36%	53%	31%	55%
LP/Threshold	73%	73%	73%	73%	73%	73%

Like Very Poor household, the Poor households in this zone managed to achieve both the Survival and Livelihood Protection Thresholds and it can be observed that the only

differences between the Very Poor (Figure 14) and Poor (Figure 15) is the contribution of own crop production to household consumption; adopters have more than their Conventional farmer counterparts. The same observation is seen were adoption of Climate Smart Agriculture is providing some cushion against the effects of drought. Farmers in the zone (both Very Poor and Poor) also engaged in some coping mechanisms by increasing both agricultural labour and local labour that is mainly provided by the middle and better of households. Another interesting point to note was that there is less contribution of agricultural labour from adopters which points to the fact they spend more time working in their plots rather than doing casual labour. An analysis of the sizes of plots cultivated in the current year showed that on average adopters are cultivating less land but harvesting more which is an indication for efficient and effective farming which is line with the concept of farming as business (FAB).

3. KEY FINDINGS & RECOMMENDATIONS

3.1 Key Findings

This second phase of CFU Climate Smart Agriculture (CSA) Outcome Analysis has shown that the current year under review (the 2018/19 agricultural season) has seen households across all wealth groups being hit hard by a major shock; the severe drought impacted ***all*** wealth groups. This was very visible in ZM 08 (Chongwe and Mazabuka), ZM09 (Choma) and ZM16 (Katete). This provided a natural occasion for observing the effects of this shock on households that have adopted versus non-adopters. It provided the CFU with an opportunity to measure resilience of CSA farmers in the face of an agriculture shock.

What is coming out explicitly in this phase of outcome analysis which is a confirmation of what was seen in the first Outcome Analysis, is that the intensity of the problem differs across wealth groups just as it also more importantly **varies between adopters and conventional farmers**. It has consistently become very clear and more evident that the problem is less pronounced among adopters of the CSA CF MT practices. The explanation was that CSA CF MT practices increase water capture and retention such that crops under CSA CF MT suffered less from the effects of prolonged moisture stress because of the use of basins.. The average number of rainy days in the 2018/19 agricultural season was far less than what was seen in 2017/18 which is a proper confirmation that the drought situation was severe in 2018/19 and it can been seen that its effect was less pronounced among adopters but severe on the conventional farmers.

In terms of the Logical framework (log frame) impact indicators, Table 3 below shows a summary of the current status.

Table 3: CSAZ Log frame Impact Indicator Summary Table

Indicator	Wealth Group	Adopting Households	Conventional Farmers
Impact Indicator 1: Proportion of Households above the Survival Threshold (ST)	Very Poor	100%	94%
	Poor	100%	100%
Impact Indicator 2: Proportion of Households above the Resilience/ Protection Threshold	Very Poor	45%	24%
	Poor	95%	36%

3.2 Recommendations

In line with what was seen and recommended from the baseline study of 2017, this second phase of CFU Climate Smart Agriculture (CSA) Outcome Analysis also makes the following recommendations:

1. After carrying out two phases of Outcome Analysis one is technically tempted to be conclusive, that conservation arming is better than conventional farming more importantly in the context of drought though, it is highly recommended to continue tracking Livelihood outcomes longitudinally using the Longitudinal Impact Monitoring and Evaluation (LIME) concept by carrying out an annual Outcome Analysis using the identified key parameters at Livelihood zone levels under different weather conditions.
2. Within the context and understanding that there was also an external Impact Evaluation of the CSAZ which was carried out by a DFID hired consultant, it will be a good investment to closely look at areas of convergence and divergence in results of these two methodologically different assessments so as to come up with a richer understanding of the internal workings of the CSA technologies.
3. There is also need to bring a human face to the methodology (evidence from program participants) by employing other methodologies so as to clearly bring out explanations and attributions to the programme. It is hereby therefore recommended that in subsequent studies, case studies or the use of the Most Significant Change (MSC) stories be also added to compliment the HEA framework. This qualitative dimension of documenting stories of change will help to explain CSA impacts/ or lack of impacts on the Livelihood of the farmers.
4. The Conservation Farming Unit should also develop intensify strategies to mechanise CF so as to help farmers to significantly increase the plot sizes which could lead to higher yields and at the same allowing those farmers who view CF as labour intensive to adopt.

4.0 ANNEXES

4.1. Annex 1 – Impact Indicator Summary Tables by Zone

Indicator Summary Table: Zone ZM08								
	Very Poor		**Poor**		**Middle**		**Better Off**	
	Adopters	Conven.	Adopters	Conven.	Adopters	Conven.	Adopters	Conven.
ü **Impact Indicator 1:** Proportion of Households above the Survival Threshold (disaggregated by Socio-Economic status and adoption status) [Percent of households in Zone]	100%	95%	100%	98%	100%	100%	100%	100%
ü **Impact Indicator 2:** Proportion of Households above the Livelihood Protection Threshold (disaggregated by Socio-Economic status and adoption status) [Percent of households in Zone]	12%	0%	23%	20%	45%	33%	60%	55%
Indicator Summary Table: Zone ZM09								
	Very Poor		**Poor**		**Middle**		**Better Off**	
	Adopters	Conven.	Adopters	Conven.	Adopters	Conven.	Adopters	Conven.
ü **Impact Indicator 1:** Proportion of Households above the Survival Threshold (disaggregated by Socio-Economic status and adoption status) [Percent of households in Zone]	100%	95%	100%	100%	100%	100%	100%	100%
ü **Impact Indicator 2:** Proportion of Households above the Livelihood Protection Threshold (disaggregated by Socio-Economic status and adoption status) [Percent of households in Zone]	15%	0%	20%	10%	35%	24%	15%	10%

Indicator Summary Table: Zone ZM16								
	Very Poor		**Poor**		**Middle**		**Better Off**	
	Adopters	Conven.	Adopters	Conven.	Adopters	Conven.	Adopters	Conven.
Impact Indicator 1: Proportion of Households above the Survival Threshold (disaggregated by Socio-Economic status and adoption status) [Percent of households in Zone]	100%	100%	100%	100%	100%	100%	100%	100%
Impact Indicator 2: Proportion of Households above the Livelihood Protection Threshold (disaggregated by Socio-Economic status and adoption status) [Percent of households in Zone]	21%	0%	34%	15%	25%	19%	34%	28%
Indicator Summary Table: Zone ZM17								
	Very Poor		**Poor**		**Middle**		**Better Off**	
	Adopters	Conven.	Adopters	Conven.	Adopters	Conven.	Adopters	Conven.
ü **Impact Indicator 1:** Proportion of Households above the Survival Threshold (disaggregated by Socio-Economic status and adoption status) [Percent of households in Zone]	100%	100%	100%	100%	100%	100%	100%	100%
ü **Impact Indicator 2:** Proportion of Households above the Livelihood Protection Threshold (disaggregated by Socio-Economic status and adoption status) [Percent of households in Zone]	15%	0%	26%	11%	28%	20%	32%	21%

4.2 Annex 2 – Assessment Team and Areas

List of Research team members

Name of Person	Designation	Phone number	Email Address
Sebastian Gavera	Technical Adviser	+263774018717	sgavhera@gmail.com
Innocent Kaba	HEA Peer Reviewer	+961 7071 6888	inocentkaba@gmail.com
Chisenga Chimenge	Data Manager	+260977392085	0977392085cc@gmail.com
Cuthbert Kapumpe	Data Manager	+260955904987	ckapumpe@gmail.com
Angela Chile	Research Assistant	+260979719062	chileanela3@gmail.com
Joelle Shilanda	Research Assistant	+260971945090	jshilanda95@gmail.com
Deborah Chisha	Research Assistant	+260977445540	deborahchisha@yahoo.com
Brian Muwema	Research Assistant	+260975694888	zaloumisnabita@yahoo.com

The table below summarises the areas visited in the four zones:

Livelihood zone	Livelihood zone name (actual districts under study)	Areas visited
ZM 08	Commercial Rail Line Maize, Livestock, and Cotton (Chongwe, Kafue and Mazabuka)	Nkondola (Chongwe) Lukoshi (Chongwe) Nkomesha (Chongwe) Dumba (Mazabuka) Chiyawa (Mazabuka)
ZM 09	Southern Plateau Cattle, Maize and Tobacco (Choma)	Chipande Mbabala Batoka Kamwanu Njebe
ZM 16	Eastern Plateau Maize, Cotton and Groundnut (Katete)	Mwandafisi Singa Mpamba Chikuni (Vulamukoko) Kampambe 1
ZM 17	Eastern Plateau Maize, Groundnut, Tobacco and Trade (Chipata)	Tigwilizane Chiparamba Chitaza Chibale Mshikate

4.3. Annex 3 – Data Collection Tools Used In the Assessment and Assignment TORS

Annex	Item	Attachment
Annex 3.1	HEA Tool 1 Key informant Tool	 2 FGD Guide_Conservation
Annex 3.2	HEA Tool 2 Market Tool	 Interview Form 2.doc
Annex 3.3	Outcome Analysis Assignment Terms of Reference	 CFU OA Terms of Reference 2019.doc